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Two new species of the spider genus *Loxosceles* (Araneae, Sicariidae) from the Ecuadorian Andes

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Abstract

Two new species of the spider genus *Loxosceles* (Araneae: Sicariidae) from the Ecuadorian Andes are described: *Loxosceles guayllabamba* **sp. nov.** (male, female) and *Loxosceles binfordae* **sp. nov.** (male, female). Both species are part of the second most speciose "*laeta*" group, which include twenty-four described species. Only three species are known to occur on mainland Ecuador, and one species in the Galapagos. The synonymy of *L. alicea* under *L. rufescens* is rejected, detailed SEM of the female internal genitalia and a map of all the species from mainland Ecuador are presented.

Key Words

South America, diversity, synspermiata, synonymy, taxonomy

Introduction

The spider family Sicariidae (172 described species) is composed currently by three genera, the African genus *Hexophthalma* Karsch, 1879 (8 species), the American genus *Sicarius* Walckenaer, 1847 (21 species) and the widely distributed genus *Loxosceles* Heineken & Lowe, 1832 (143 species). *Loxosceles* is by far the most diverse and accounts for 83% of the family diversity (World Spider Catalog 2023). These spiders occur naturally on all continents except Oceania and Antarctica. Many *Loxosceles* species display a propensity to live close to human, and live in and around houses and buildings, in waste and human debris. In their natural habitat, *Loxosceles* spiders are found under rocks, logs, or the bark of dead trees and, in caves (Gertsch 1958, 1967; Gertsch and Ennik 1983; Bertani et al. 2018). In South America *Loxosceles* occurs in a variety of natural habitats, such as dry, xerophytic forests, semi-arid vegetation, and transitional coastal desert regions (Brescovit et al. 2017; Fukushima et al. 2017).

Loxosceles spiders have gained notoriety due to their bites, that occasionally become necrotic and, less commonly, can produce systemic effects. However, this is relatively uncommon and is largely limited to areas where these spiders are endemic (Vetter 2022) or in the case of highly synanthropic species such as *L. laeta* (Brescovit et al. 2017).

The American part of the genus was revised by Gertsch (1958, 1967), and Gertsch and Ennik (1983). Binford et al. (2008: fig. 1) phylogenetically supported eight species groups (*reclusa*, *laeta*, *amazonica*, *gaucho*, *spadicea*, *rufescens*, *vonwredei*, and *spinulosa*), of which five occur in the Americas and three in Africa. Recently, the *amazonica* species group was synonymized under the *rufescens* group (Duncan et al. 2010; Fukushima et al. 2017); as such, the genus is currently composed of seven species groups (Valdez-Mondragón et al. 2018). Valdez-Mondragón et al. (2018) evaluated that the *reclusa* group

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is the most diverse including 50 species, while the *laeta* group includes about 24 described species. It should be noted that some recently described species (e.g. from Brazil) were not assigned to any species groups while other species (e.g. *Loxosceles carabobensis* González-Sponga, 2010) lack morphological information to allow a clear species group association. Even though the genus was studied extensively, a remarkable number of new species (28 species) have been described in the past decade. Many new species have been described from Brazil (Andrade et al. 2012; Fukushima et al. 2017), Chile (Brescovit et al. 2017; Taucare-Ríos et al. 2022), Venezuela (González-Sponga 2010), Mexico (Valdez-Mondragón et al. 2018, 2019; Navarro-Rodríguez et al. 2020) and Cuba (Sánchez-Ruiz and Brescovit 2013). Moreover, several troglophile species have been described from caves in Brazil (Bertani et al. 2018; Souza and Ferreira 2018) and Colombia (Cala-Riquelme et al. 2015).

Only three species of *Loxosceles* are known to occur in mainland Ecuador: *Loxosceles gloria* Gertsch, 1967 is known to occur on the coast, while the remaining species occur in the Andes (*Loxosceles lutea* Keyserling, 1877 and *Loxosceles taeniopalpis* Simon, 1907). *Loxosceles laeta* has only been recorded from the Galapagos Islands (Banks 1902; Baert et al. 2008; Buchholz et al. 2020). Even though Gertsch (1967) mentions that the species is distributed throughout Ecuador, no precise localities except the Galapagos Islands is given by him, and no records of *L. laeta* on mainland Ecuador was found despite further literature search.

Herein, two new *Loxosceles* species from the Ecuadorian Andes are described, both species belong to the *latea* group *sensus* Gertsch (1967) based on male genitalic characters: male palpal tarsus inconspicuous, short, about as broad as long; palpal bulb suboval. Additionally, a distribution map of all species recorded from the Ecuadorian mainland is given.

Materials and methods

The specimens were stored in 70% ethanol and examined under a Leica M125 dissection microscope. Specimen imaging was achieved using a custom-made BK Plus lab System by Dun, Inc. with an integrated Canon camera, macro lens (65 mm), and the Zerene stacking software (Zeren Systems LLC 2018). Female genitalia were dissected using a sharp entomological needle, washed in distilled water, and digested with a Pancreatin solution following Álvarez-Padilla and Hormiga (2007). Specimens were prepared for SEM imaging by dehydration using ethanol solution from 70% to 100% and then transferred to Hexamethyldisilazane (HMDS 99%) for 3 hours. Specimens were mounted on an SEM stub and images were obtained using a Hitachi tabletop TM4000 plus SEM. All measurements are in millimetres and were made using a Leica M205A with Leica Application Suite X. ECFN acronym found in the text and on the labels refers to Ecuador Field Number, a unique number attached to every specimen. The maps were done with Google Earth Pro software.

Comparative material examined and imaged: *L. taeniopalpis* Simon, 1902 from Ecuador, Loja, Amalusa (-04.578636, -79.440408) 1874 m, dry forest, 17♀1 juv., 13.xi.2021, I. Tapia (ECFN 7618-7635) (QCAZ); *L. lutea* (ECFN 4479) from Ecuador, Chimborazo, Guasuntos (-02.24865, -78.84925) 2373 m, hand collected under a pile of big rocks in dry area, 1♀, 6 Mar. 2020, Nadine Dupérré, Anabelle A. Tapia, Elicio E. Tapia (QCAZ); *L. lutea* (ECFN 4608) from Ecuador, Cotopaxi, Laguna de Yambo (-01.09372, -78.58925) 2694 m, 1♂, hand collected under rocks, 7 Mar. 2020, Nadine Dupérré, Anabelle A. Tapia, Elicio E. Tapia (QCAZ); same data (ECFN (4595) 1♀.

Specimens examined are deposited in the following institutions:

AMNH American Museum of Natural History, New York, USA.
MCZ Museum of Comparative Zoology, Harvard University, Cambridge, USA.
USNM National Museum of Natural History, Smithsonian Institution, Washington D.C., USA.
QCAZ Museum of Invertebrates, Pontificia Universidad Católica, Quito, Ecuador.
ZMH Zoological Museum Hamburg, Hamburg, Germany.

Abbreviations

ALE anterior lateral eye
PLE posterior lateral eye
PME posterior median eye

Taxonomy

Family Sicariidae Keyserling, 1880

Genus *Loxosceles* Heineken & Lowe, 1832

Type species. *Loxosceles citigrada* Heineken & Lowe, 1832.

Diagnosis. Members of the genus *Loxosceles* are distinguished from all other Sicariidae, *Sicarius* and *Hexophthalma*, by the absence of soil-adhering setae and a large colulus, soil-adhering setae present and large colulus absent in the latter genera (Magalhaes et al. 2017).

Description. (For complete description see Gertsch 1967). Medium-sized spiders (6–12 mm); two tarsal claws; ecribellate; haplogyne; six-eyes in three diads; chelicerae with stridulatory files; stridulatory pick at base of palpal femur.

Composition. 143 species (World Spider Catalog 2023), plus the two new species herein described: *L. binfordae* sp. nov. and *L. guayllabamba* sp. nov.

Distribution. Americas, Southern Africa, the Mediterranean region, and South Europe.

Loxosceles guayllabamba **Dupérré & Tapia, sp. nov.**

https://zoobank.org/995F5DC9-D2B3-4343-B116-882131BF0B51

Figs 1–3, 9A, B, G, Map 1

Type material. Male holotype from Ecuador, Pichincha Province, Quito, Lirios de Carcelen (-00.083424, -78.456323) 2586 m, 17 Nov. 2019, hand collected in holes and under rocks in dry area, E. Tapia, De Rossi Tapia, ECFN 3678 (QCAZ). **Paratypes:** same data as holotype: 1♀, ECFN 2777 (QCAZ); 1♂, ECFN 3677 (QCAZ); 1♀ ECFN 7773 (QCAZ) 2♀, ECFN 7768 7769 (QCAZ); 2♀1♂ ECFN 7764 (AMNH); 3♀ ECFN 7766 7772 (ZMH-A0014267, A0014268, A0014270); 2♂3juv., hand collected in house, E. Tapia, De Rossi Tapia,(ZMH-A0014271); 1♂, hand collected in garage, E. Tapia, De Rossi Tapia, ECFN 3676 (ZMH-A0015445); 1♂ ECFN 7762 (ZMH-A0014269); 1♀1♂ (USNM); 1♀1♂ (MCZ).

Other material examined. Ecuador: *Pichincha*: Bosque Protector Jerusalem (00.000075, -78.355095) 7♂10♀, collected under rocks, dead trees, old tree bark and old Agave leaves, 23.XII.2022, E. E. Tapia (QCAZ, ZMH-A0019764, 19765, USNM); Quito, Lirios de Carcelen (-00.083424, -78.456323) 2586 m, 17 Nov. 2019, 2juv., hand collected in holes and under rocks in dry area, E. Tapia, De Rossi Tapia (ZMH-A0015443, A0015444); 3♂2♀5juv., ECFN 7761 7763 7765 7767 7771 7774 7937 7938 (DTC). *Imbabura*: Pimapiro [00°24'20.25"N, 77°56'20"W] 2038 m, 5 Jan 2003, 1♂1♀, R. Cardenas (QCAZ).

Diagnosis. Males most resemble *L. rufipes* (Lucas, 1834) and *L. lutea* Keyserling, 1877 but are distinguished as such: from *L. rufipes* by their shorter, non-sinuous embolus (Fig. 2A, B, D) while in the latter the embolus is long and sinuous (see Gertsch and Ennik 1983: fig. 335); from

Figure 1. *Loxosceles guayllabamba* sp. nov. Holotype male. **A.** Habitus, dorsal view; **B.** Habitus, ventral view. Paratype female; **C.** Habitus, dorsal view; **D.** Habitus, ventral view. Scale bars: 1.0 mm.

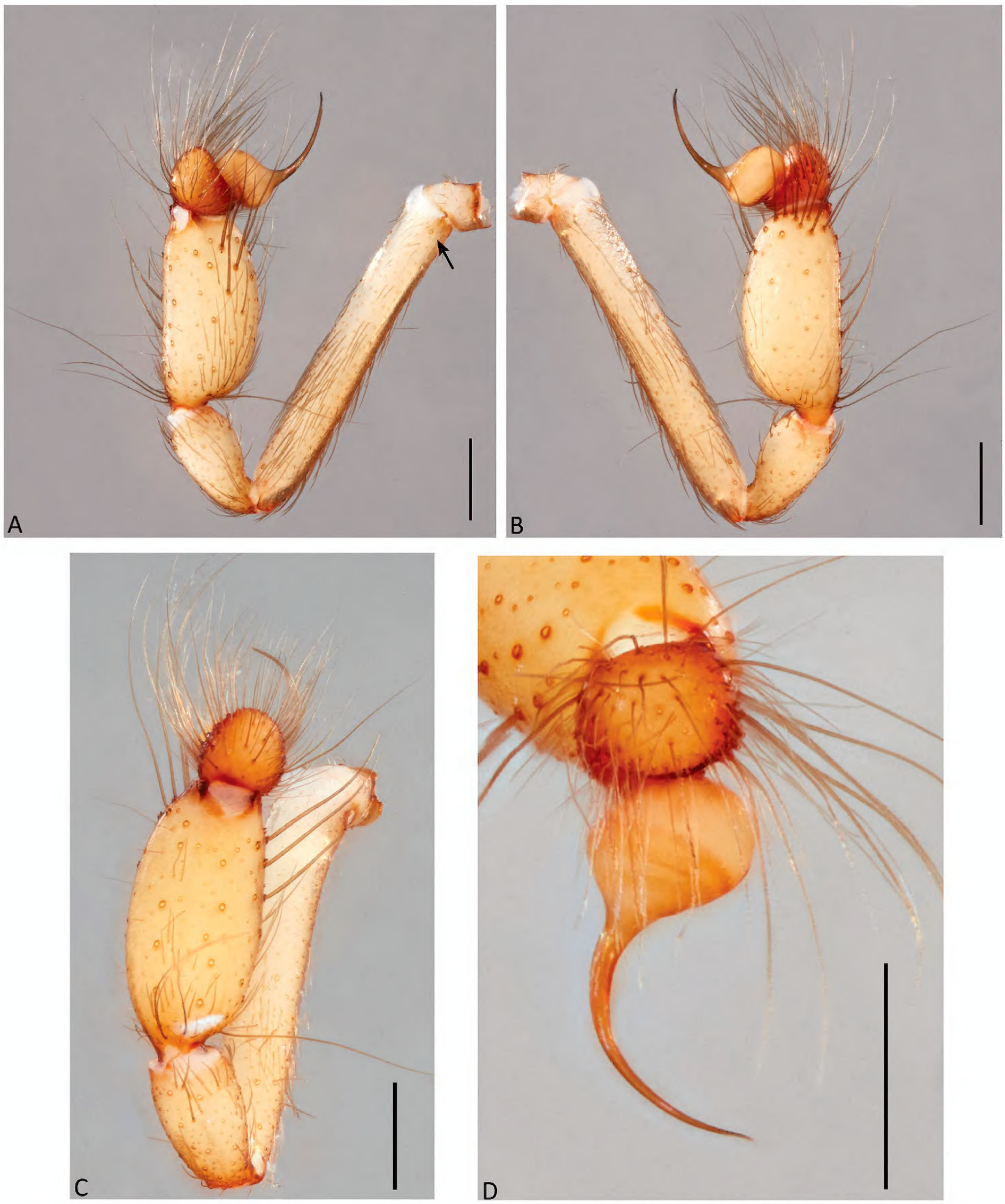

Figure 2. *Loxosceles guayllabamba* sp. nov. Holotype male. **A.** Palp, prolateral view (arrow points to stridulatory pick); **B.** Palp, retrolateral view; **C.** Male palpal tibia, dorsal view; **D.** Male bulb, apical view. Scale bars: 0.5 mm.

L. lutea by their palpal tibia not thickened in basal third and femur longer (6.5× longer than wide) (Fig. 2A, B), while palpal tibia thicker in basal third (Fig. 8A, B; Gertsch 1967: plate 19, fig. 1) and 4.2× longer than wide (Gertsch 1967: 166). Females most resemble *L. alicea* Gertsch, 1967, *L. lutea*, and *L. binfordae* sp. nov. but are distinguished by their short spermathecae (as long as wide) with wide bases and small pointed outer lobes (Fig. 3A–D, G, H); while *L. alicea* Gertsch, 1967 has spermathecae without outer lobes (Gertsch 1967: plate 10, fig. 11); *L. lutea* has elongated (1.3× longer than wide) and constricted spermathecae (Fig. 7G, H) and *L. binfordae* sp. nov. has shorter (0.6× longer than wide) spermathecae with wide outer lobes (Fig. 6A–D, G, H).

Description. Male (holotype): Total length: 6.06; carapace length: 2.7; carapace width: 2.28; abdomen length: 3.36.

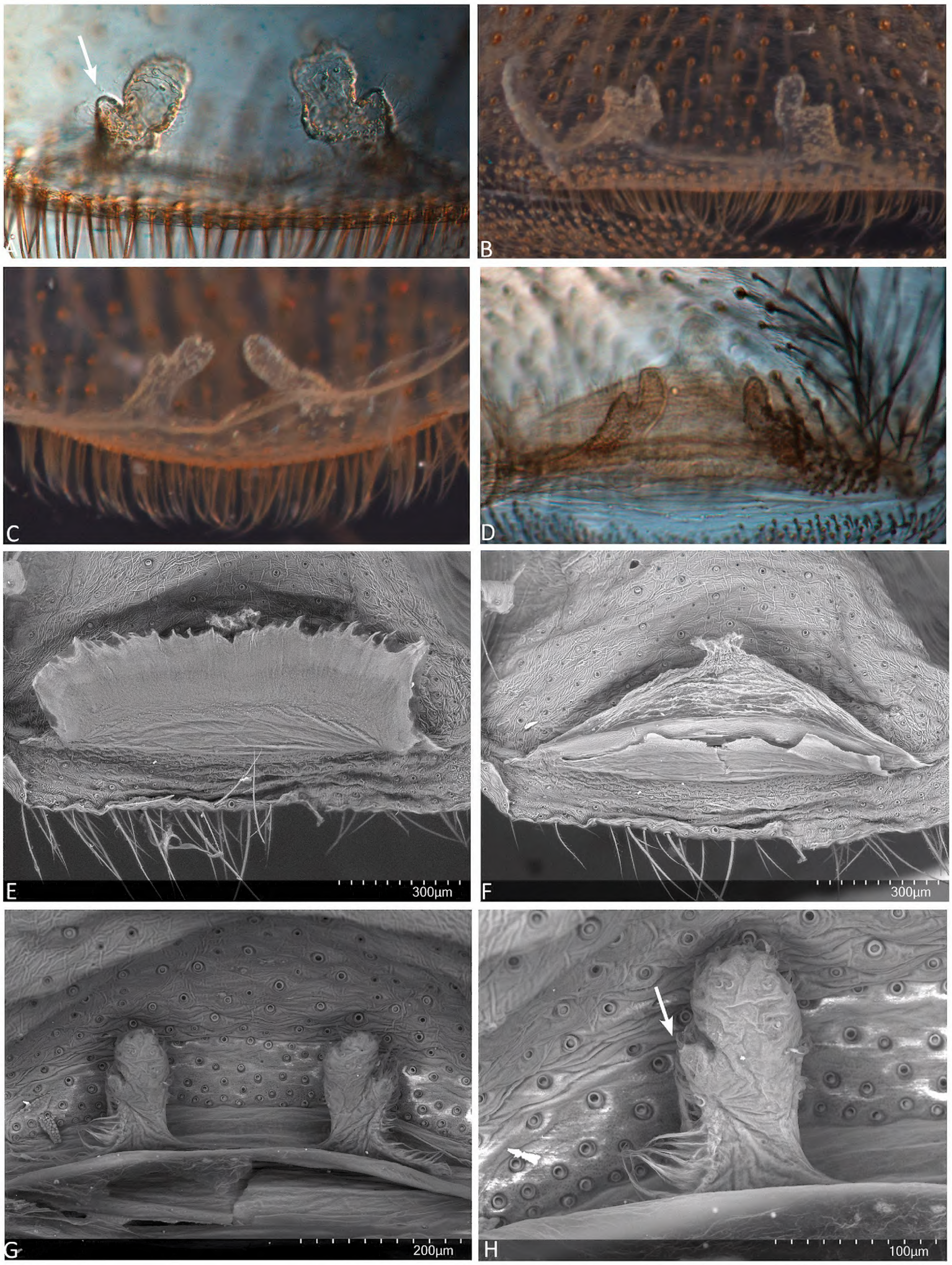

Figure 3. *Loxosceles guayllabamba* sp. nov. Female internal genitalia. **A.** Dorsal view, paratype (ECFN 2777); **B.** Dorsal view, paratype (ECFN 7769); **C.** Dorsal view, paratype (ECFN 7776); **D.** Dorsal view, paratype (ECFN 7770); **E.** SEM, dorsal view uterus (ECFN 7768); **F.** SEM, dorsal view bursa copulatrix (ECFN 7768); **G.** SEM, dorsal view spermathecae (ECFN 7768); **H.** SEM, dorsal view left spermathecae (ECFN 7768).

Cephalothorax. Carapace light yellow-brown, piriform, with darker red-brown pars cephalica dorsally (Fig. 1A); clypeus 0.22, light brown. Sternum light yellow, longer than wide; labium light yellow, trapezoidal, fused to sternum; endites yellow, white apically; longer than wide (Fig. 1B).

Chelicerae. Orange-brown; fused basally, with chelated chelicerae laminae; stridulatory organ well developed with ~34 files; fangs orange-brown, paler distally.

Eyes. Six eyes in three diads; PME: 0.12, ALE: 0.14, PLE: 016, PLE-PLE: 0.77 (Fig. 1A).

Abdomen. Dorsally grayish, elongated oval (Fig. 1A); ventrally light gray (Fig. 1B); colulus triangular.

Legs. Light yellow (Fig. 1A, B). Legs measurements: I 15.18 (4.10/0.73/4.49/4.59/1.27); II 18.32 (4.54/0.76/5.21/5.27/1.54); III 13.37 (3.78/0.61/3.66/4.02/1.30); IV 15.45 (4.15/0.75/4.28/4.81/1.46). Leg formula: 2413.

Palp. Femora light yellow, long and thin (1.91 length/0.29 width = 6.5×) with stridulatory pick basally (Fig. 2A); patellae light yellow; tibiae light yellow, (1.07 length /0.56 width = 1.9×) long and thick, almost straight dorsally, thicker mid-ventrally; tarsus dark reddish orange (Fig. 2A, C). Palp bulb oval, with evenly, tightly curved embolus (Fig. 2B, D); tip of embolus not twisted (Fig. 9A, B, arrow).

Female (paratype): Total length: 8.03; carapace length: 3.27; carapace width: 2.7; abdomen length: 4.76.

Cephalothorax. Carapace red-brown, piriform; darker brown along radiation lines and fovea (Fig. 1C); clypeus 0.26, dark brown. Sternum orange, longer than wide; labium reddish-brown, trapezoidal, fused to sternum; endites reddish-brown, white apically; longer than wide (Fig. 1D).

Chelicerae. Dark reddish-brown; fused basally, with chelated chelicerae laminae; stridulatory organ well developed with ~29 files; fangs reddish-brown, paler distally.

Eyes. Six eyes in three diads; PME: 0.14, ALE: 0.16, PLE: 016, PLE-PLE: 0.98 (Fig. 1C). ***Abdomen.*** Dorsally grayish, elongated oval (Fig. 1C); ventrally light gray; colulus triangular (Fig. 1D).

Legs. Orange-brown (Fig. 1C, D). Legs measurements: I 13.73 (3.68/0.79/4.08/3.88/1.30); II 15.33 (4.42/0.88/4.59/4.03/1.41); III missing; IV 15.11 (4.41/0.87/3.93/4.52/1.38). Leg formula: 241-.

Palp. Femur light orange with basal stridulatory pick; patellae light orange; tibia and tarsus dark reddish brown.

Genitalia. Spermathecae elongated, apically rounded; as long as wide (1×); with small pointed outer lobe (Fig. 3A, arrow); bases of spermathecae wide (Fig. 3A–D, G, H).

Etymology. The specific name is a noun in apposition taken from the region where the species was collected, Guayllabamba parish.

Distribution. Ecuador, Imbabura and Pichincha provinces.

Natural history. Specimens were collected between 2038–2586 m in the inter-Andean valley. Most specimens were collected under rocks, debris, in between leaves of dead Agave plants, and a few specimens were collected in a house or in adjacent garage (Fig. 10).

Loxosceles binfordae **Dupérré & Tapia, sp. nov.**

https://zoobank.org/F67BDF69-AF47-4361-8645-8E58F3FC7A92

Figs 4–6, 9C, D, H, Map 1

Type material. Male holotype from Loja Province, Oña (-03.47523, -79.160351) 2242 m, 5.III.2020, hand collected under rocks and logs in dry area, N. Dupérré, E. Tapia, A. Tapia, ECFN 4457 (QCAZ). **Paratypes:** same data as holotype, 1♂5♀, ECFN 7662 7665–7667 7674 (QCAZ); Oña (-03.472523, -79.160351) 2242 m, 5.III.2020, hand collected under rocks and logs, N. Dupérré, E. Tapia, A. Tapia, 2♀ (ZMH-A0014264, 14625), 1♀ (ZMH-A0015437), 2♀ (ZMH-A0015488, 15489), 1♂, (ZMH-A0015490), 1♀ (ZMH-A0015614), 2♂3♀2juv. (ZMH-A0014266); 1♂2♀ (USNM), 1♂2♀ (AMNH), 2♂2♀ (QCAZ), 1♂2♀ (MCZ); (-03.471850, -79.168543) 2252 m, 16.XI.2021, hand collected under rocks in dry area, I. Tapia, ECFN 7657 (QCAZ).

Other material examined. Ecuador: *Loja Province*: Oña (-03.472523, -79.160351) 2242 m, 5.III.2020, 1♂, 1juv., hand collected under rocks and logs, N. Dupérré, E. Tapia, A. Tapia ECFN 4520 (DTC); Oña (-03.471850, -79.168543) 2252 m, 16.XI.2021, 2♂7♀10juv., hand collected under rocks in dry area, I. Tapia ECFN 4515 7625 7630 7671 7654 7862 (DTC).

Diagnosis. Males most resemble *L. taeniopalpis* Simon, 1907 and *L. inca* Gertsch, 1967 but are distinguished by their shorter palpal femur and tibia, femur 7× as long as wide, tibia 2.8× long as wide (Fig. 5A, B), while in *L. taeniopalpis* the palpal femur is 8× as long as wide and the tibia 3.5× as long as wide (see Gertsch 1967:165, plate 11, fig. 4); and from *L. inca* by its leg formula 2413, while 2143 in *L. inca* (see Gertsch 1967: 163). Females most resemble *L. taeniopalpis*, *L. inca* and, *L. guayllabamba* sp. nov. but are distinguished by their spermathecae rounded, short (0.6×); with low, wide outer lobes (Fig. 6A–D, G, H) while in *L. taeniopalpis* the spermathecae are shorter than wide (0.3×) and with two outer lobes (Fig. 7C, D, arrows); from *L. inca* by their spermathecae with outer lobes (Fig. 6A–D, G, H) absent in the latter (see Gertsch 1967: pl.10 fig. 4) and from *L. guayllabamba* sp. nov., by their spermathecae shorter than wide (0.6×), while in the latter the spermathecae are as long as wide (1×) (Fig. 3A, C).

Description. Male (holotype): Total length: 7.78; carapace length: 3.29; carapace width: 2.6; abdomen length: 4.49.

Cephalothorax. Carapace orange-brown, piriform, pars cephalica darker; darker brown along radiation lines (Fig. 4A); clypeus 0.19, dark orange-brown.

Chelicerae. Dark orange-brown; fused basally, with chelated chelicerae laminae; stridulatory organ well developed with ~32 files; fangs reddish-brown, paler distally; sternum light yellow, longer than wide; labium light orange, trapezoidal, fused to sternum; endites orange, white apically; longer than wide (Fig. 4B).

Eyes. Six eyes in three diads; PME: 0.14, ALE: 0.21, PLE: 0.18, PLE-PLE: 0.82 (Fig. 6A).

Figure 4. *Loxosceles binfordae* sp. nov. Holotype male. **A.** Habitus, dorsal view; **B.** Habitus, ventral view. Paratype female; **C.** Habitus, dorsal view; **D.** Habitus, ventral view. Scale bars: 1.0 mm.

Abdomen. Dorsally and ventrally light grayish, elongated oval (Fig. 4A, B); colulus triangular.

Legs. Light orange-brown, femur slightly darker (Fig. 4A, B). Legs measurements: I 17.77 (4.82/1.09/5.03/5.36/1.47); II 19.2 (5.14/0.88/5.74/5.81/1.63); III 15.57 (4.37/0.86/4.12/5.25/0.97); IV 17.93 (4.92/1.02/4.93/5.66/1.4). Leg formula: 2413.

Palp. Femora light yellow-orange, long and thin (2.25 length /0.32 width = 7.0×) with stridulatory pick basally (Fig. 5A); patellae light yellow-orange; tibiae orange, long (1.27 length /0.45 width = 2.8×) and thin (Fig. 5C); straight dorsally, slightly bulging than ventrally; tarsus reddish-orange (Fig. 5A, B). Palp bulb rounded, with an evenly, widely curved embolus; tip twisted at (1/3) of embolus tip (Fig. 9C, D arrow).

Female (paratype): Total length: 10.5; carapace length: 4.4; carapace width: 3.56; abdomen length: 6.1.

Cephalothorax. Carapace brown, piriform, without violin-shaped pattern dorsally; darker brown along radiation lines and fovea (Fig. 4C); clypeus 0.41, dark brown.

Chelicerae. Dark reddish-brown; fused basally, with chelated chelicerae laminae; stridulatory organ well developed with ~22 files; fangs reddish-brown, paler distally. Sternum orange, longer than wide; labium reddish-brown, trapezoidal, fused to sternum; endites reddish-brown, white apically; longer than wide (Fig. 4D).

Eyes. Six eyes in three diads; PME: 0.14, ALE: 0.18, PLE: 021, PLE-PLE: 1.22 (Fig. 4C).

Abdomen. Dorsally dark grayish, elongated oval (Fig. 4C); ventrally light gray (Fig. 4D); colulus triangular.

Figure 5. *Loxosceles binfordae* sp. nov. Holotype male. **A.** Palp, prolateral view (arrow points to stridulatory pick); **B.** Palp, retrolateral view; **C.** Male palpal tibia, dorsal view; **D**. Male bulb, apical view. Scale bars: 0.5 mm.

Legs. Light orange-brown, femur slightly darker (Fig. 4C, D). Legs measurements: I 20.4 (5.53/1.3/6.58/5.52/1.47); II 22.14 (6.04/1.46/6.76/6.34/1.54); III 18.62 (5.43/1.39/4.88/5.57/1.35); IV 21.93 (6.05/1.54/6.13/6.48/1.73). Leg formula: 2413.

Palp. Femur light orange with basal stridulatory pick; patellae light orange; tibia and tarsus dark reddish brown.

Genitalia. Spermathecae bean-shaped, rounded apically, with wide outer lobes (Fig. 6A, arrow); short, wider than long (0.6×); bases of spermathecae wide (Fig. 6A–D, G, H).

Etymology. The specific name is in honor of Greta Binford, arachnologist and evolutionary biologist, in recognition of her research on *Loxosceles* venom and systematics.

Distribution. Only known from the type locality.

Natural history. Females and males were collected under rocks in a semi-deciduous shrubland of the southern Andean valleys (Fig. 11A).

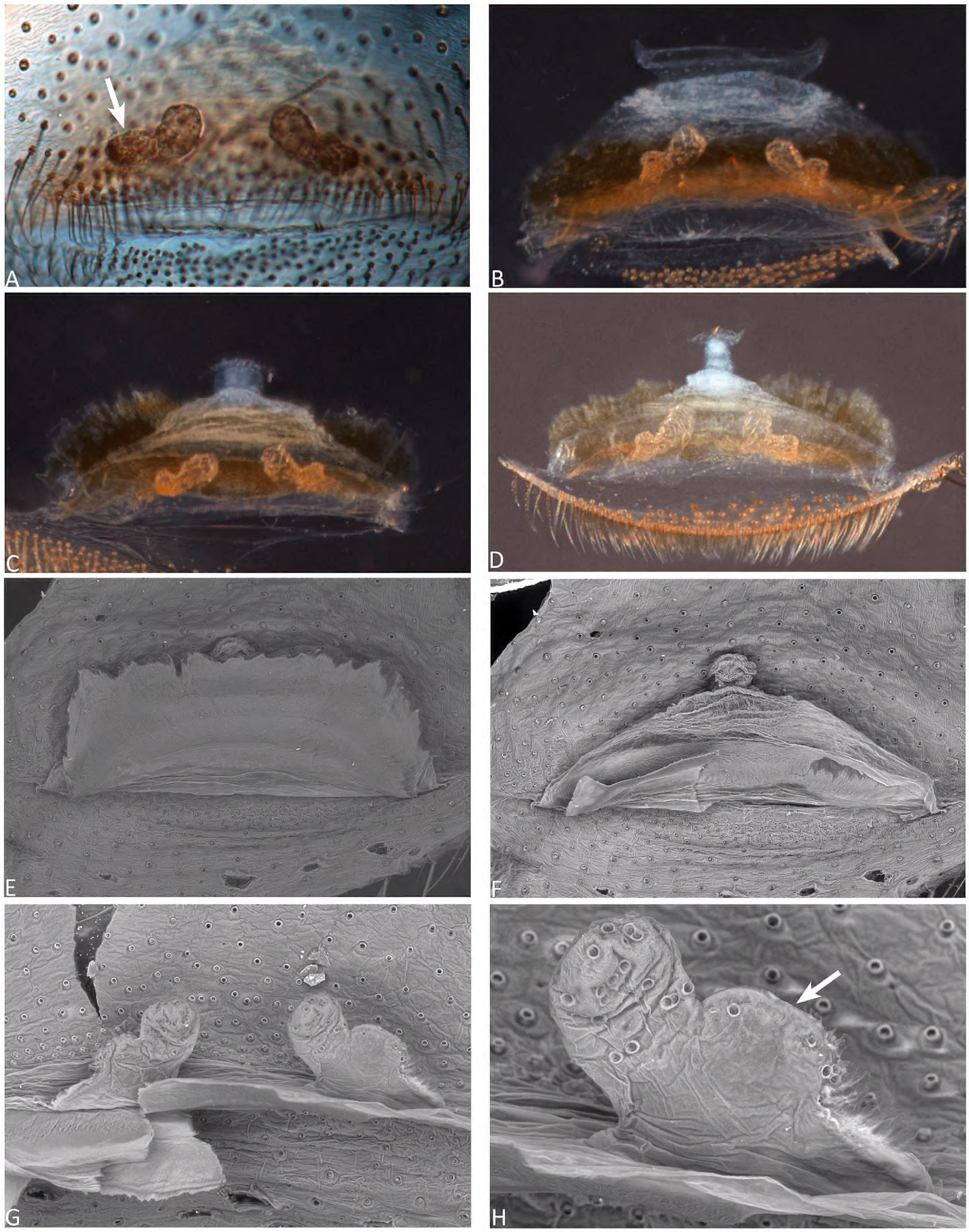

Figure 6. *Loxosceles binfordae* sp. nov. Female internal genitalia. **A.** Dorsal view, paratype (ECFN 7657); **B.** Dorsal view, paratype (ECFN 4429); **C.** Dorsal view, paratype (ECFN 4429); **D.** Dorsal view, paratype (ECFN 4434); **E.** SEM, dorsal view of uterus (ECFN 7657); **F.** SEM, dorsal view of bursa copulatrix (ECFN 7657); **G.** SEM, dorsal view of spermathecae (ECFN 7657); **H.** SEM, dorsal view of right spermathecae (ECFN 7657).

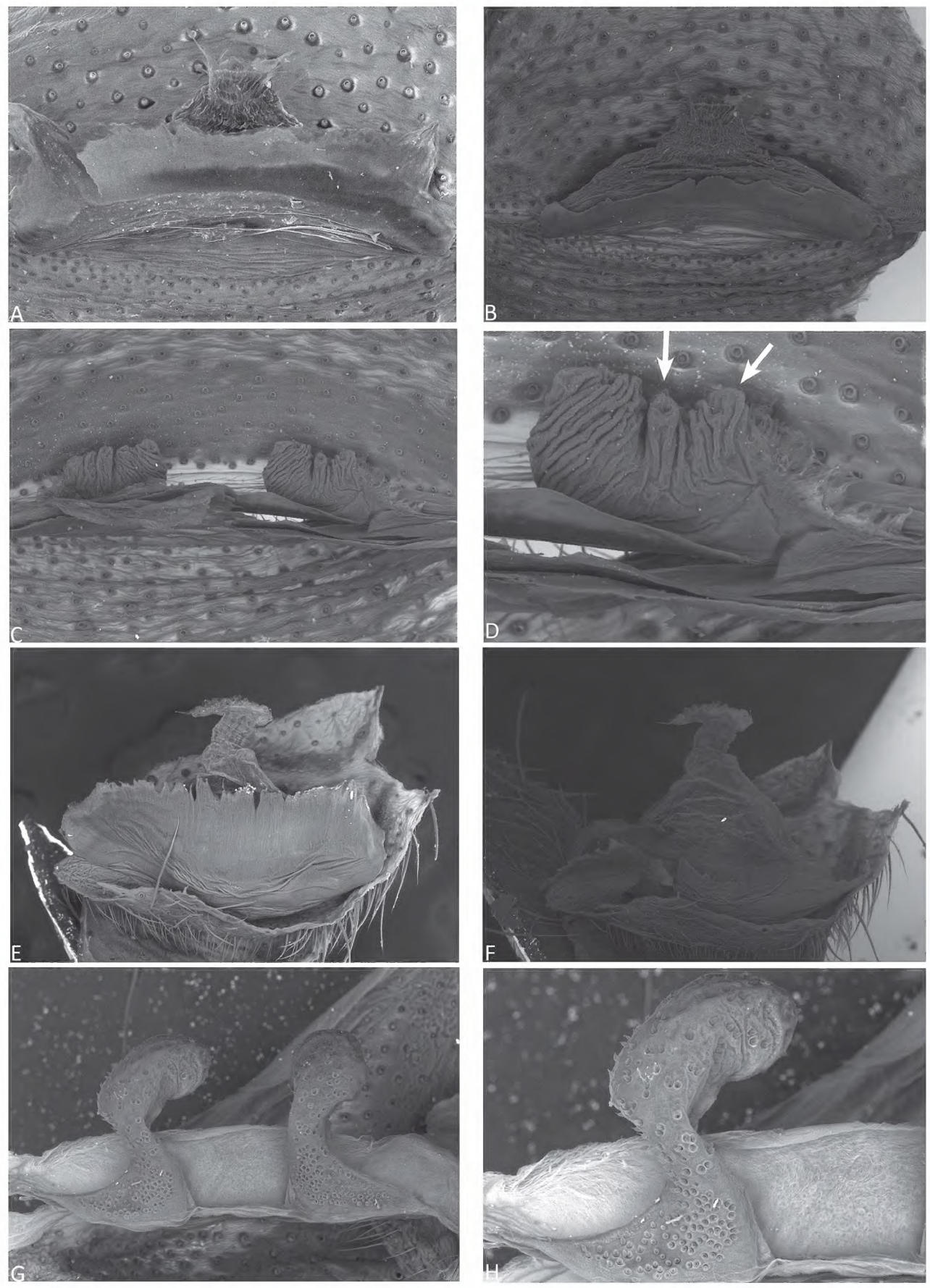

Figure 7. A–D. SEM, *Loxosceles taeniopalpis* (ECFN 7618). **A.** Dorsal view uterus; **B.** Dorsal view bursa copulatrix; **C.** Dorsal view spermathecae; **D.** Dorsal view right spermathecae; **E–H.** SEM, *Loxosceles lutea* (ECFN 4479); **E.** Dorsal view uterus; **F.** Dorsal view bursa copulatrix; **G.** Dorsal view spermathecae; **H.** Dorsal view left spermathecae.

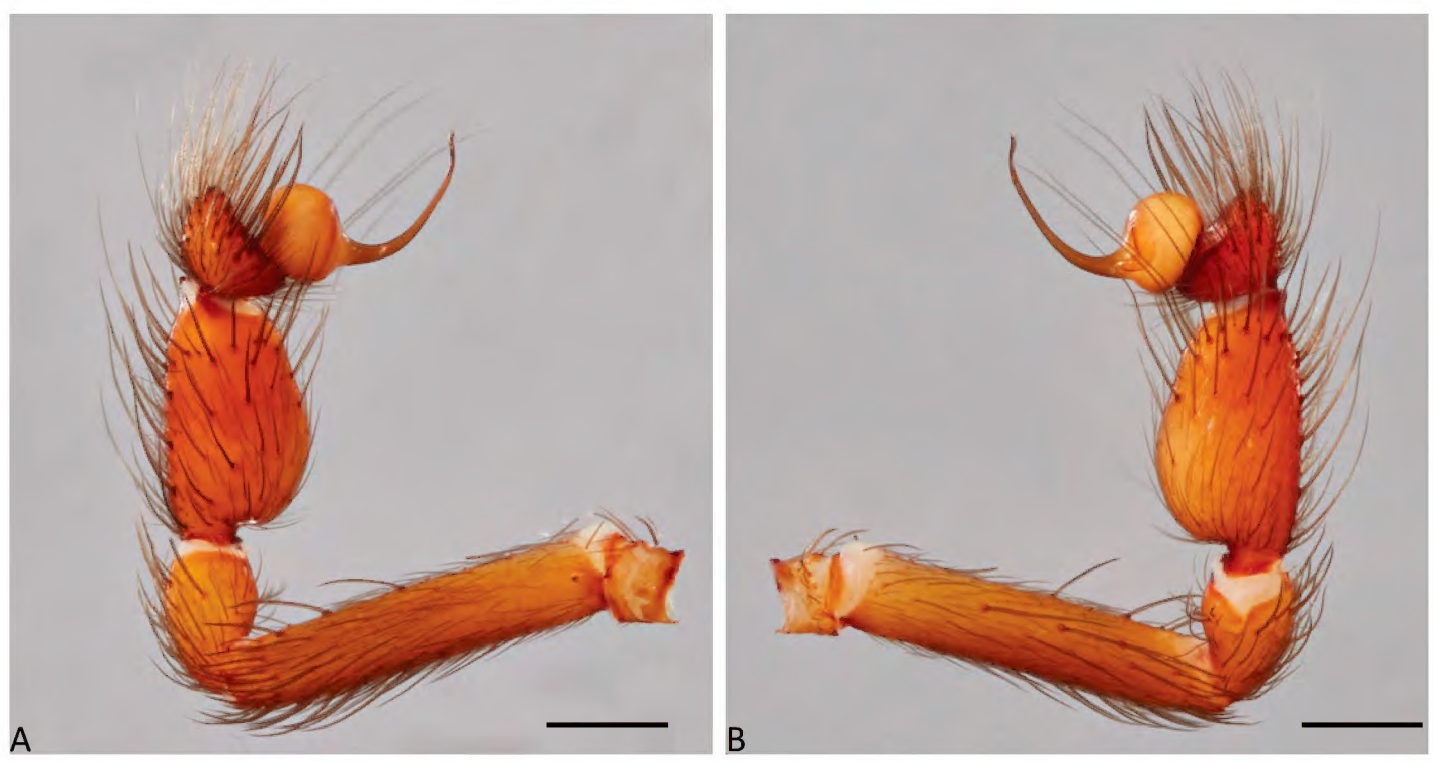

Figure 8. A, B. *Loxosceles lutea* (ECFN 4595). **A.** Palp, retrolateral view; **B.** Palp, prolateral view. Scale bars: 0.5 mm.

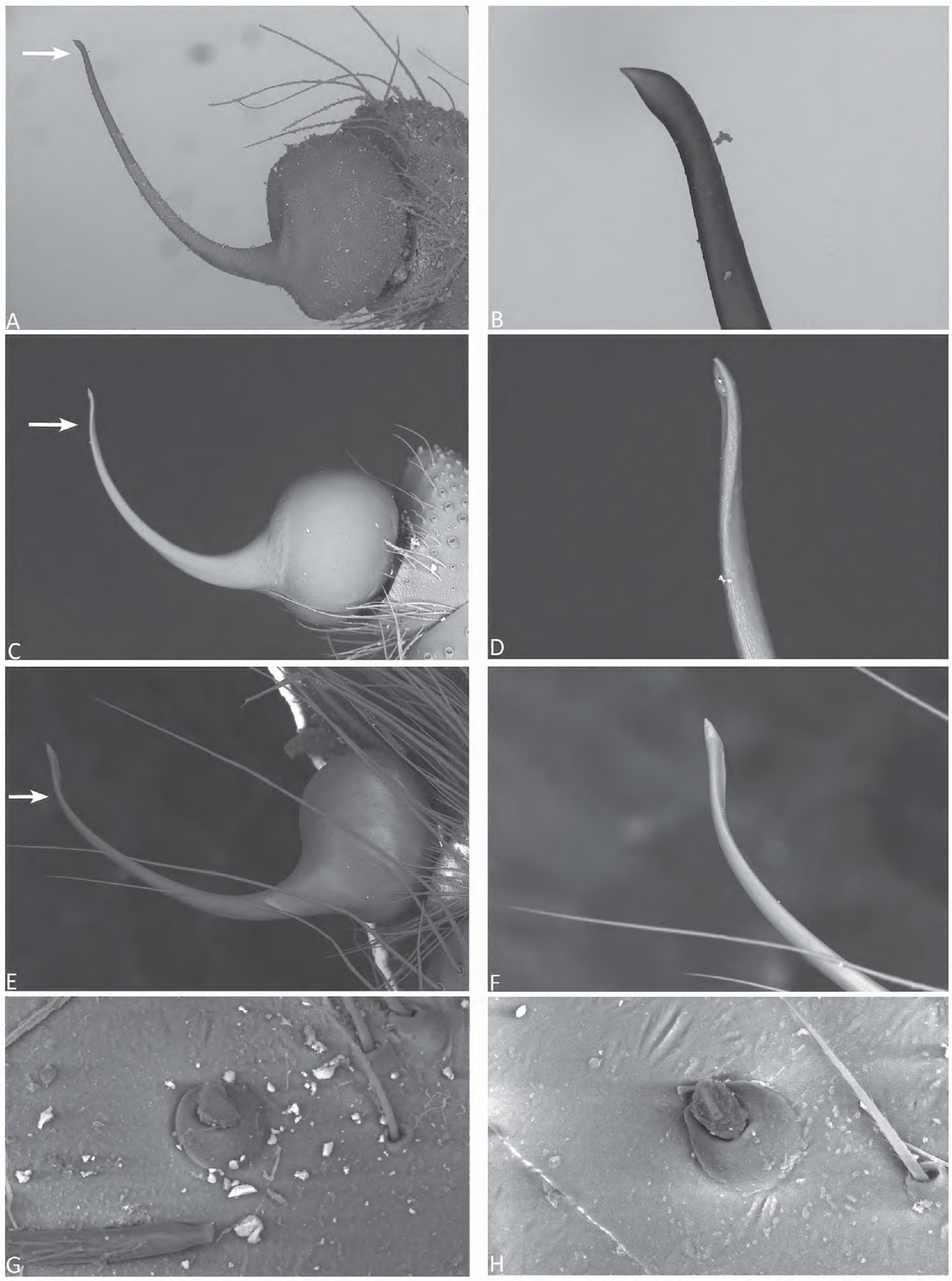

Figure 9. SEM. **A, B.** *Loxosceles guayllabamba* sp. nov. **A.** Bulb, retrolateral view (arrow point to curvature in embolus tip); **B.** Embolus, retrolateral view; **C, D.** *Loxosceles binfordae* sp. nov. **C.** Bulb, retrolateral view (arrow point to twist in embolus tip); **D.** Embolus, retrolateral view; **E, F.** *Loxosceles lutea* (ECFN 4608); **E.** Bulb, retrolateral view (arrow point to twist in embolus tip); **F.** Embolus, retrolateral view; **G.** *Loxosceles guayllabamba* sp. nov., male stridulatory pick; **H.** *Loxosceles binfordae* sp. nov., male stridulatory pick.

Discussion

In Ecuador, the diversity, distribution and medical relevance of the genus *Loxosceles* is nearly unknown. Since the work of Gertsch (1967), no new species were recognized, and no distribution or natural history data has been published on Ecuadorian *Loxosceles*. Oppositely, in the last 10 years only, 14 new species from South America have been described, mostly from Brazil and Chile (WSC 2023), including important distribution and natural history data (e.g. Cala-Riquelme et al. 2015; Bertani et al. 2017; Brescovit et al. 2017; Taucare-Ríos et al. 2022).

The discovery and description of two new species in the Ecuadorian Andes, one in a highly populated area, is relevant both taxonomically and medically. The new species *L. guayllabamba* sp. nov. was collected in the Guayllabamba valley, in which the highly populated and ever extending capital Quito is located. Furthermore, *L. lutea* distribution was extended, from the Carchi province all the way to south to the Azuay province (Map 1), whereas

Figure 10. A. *Loxosceles guayllabamba* sp. nov. habitat in Pichincha province.

it was previously known only from the Pichincha province and the Tungurahua province (Gertsch 1967). The new species *L. binfordae* sp. nov. was collected close to new housing development neighbouring the city of Oña, but so far only the *L. guayllabamba* sp. nov. was collected inside a house and a garage.

As remarked by Brescovit et al. (2017) "the most recent revision of the South American *Loxosceles* was published 50 years ago (Gertsch 1967). Nevertheless, this study is still relevant for species recognition in the region due to the quality of its illustrations and detailed descriptions." Hence, based on the comparison with the illustrations, descriptions of Gertsch (1967) and new material, the two new species are here established and distinguished from

Figure 11. A. *Loxosceles binfordae* sp. nov. habitat in Oña province; **B.** *Loxosceles taeniopalpis* habitat in Loja province.

Map 1. Distribution map of Ecuador mainland *Loxosceles* species. *Loxosceles lutea* Keyserling, 1877 (red circle), *L. guayllabamba* sp. nov. (blue square), *L. gloria* Gertsch, 1967 (black circle), *L. binfordae* sp. nov. (purple square) and *L. taeniopalpis* Simon, 1907 (yellow circle).

the previously described Andean species. The internal genitalia of females of the "*laeta*" group are considered variable, although they are semi-transparent and delicate. Therefore, both *L. guayllabamba* sp. nov. and *L. binfordae* sp. nov. internal genitalia were examined with SEM and shows clear differences from each other and from adjoining species *L. lutea* and *L. taeniopalpis* respectively (see diagnosis). Furthermore, the range of variation of the female internal genitalia for both new species are presented (Figs 3A–D, 6A–D).

Finally, Zamani et al. (2021) synonymized *L. alicea* Gertsch, 1967 from Peru with *L. rufescens* (Dufour, 1820), which is a widely distributed species (Southern Europe, northern Africa to Iran, Afghanistan) and thought to be introduced in North and South America (Valdez-Mondragón et al. 2018; World Spider Catalog 2023). Their conclusion was based on the examination of the illustration of the genitalia presented by Gertsch (1967). The synonymy is considered doubtful considering the genus's high diversity in South America, and because type specimens were not examined. Furthermore, the species is considered absent from Central and South America by several authors (Gertsch 1967; Gertsch and Ennik 1983; Nentwig et al. 2017; Taucare-Ríos et al. 2018) but present in Mexico (Valdez-Mondragón et al. 2018). Therefore, until the type of *L. alicea* Gertsch, 1967 can be examined the synonymy presented by Zamani et al. (2021) is rejected here.

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